Sodium, Potassium, and Magnesium Concentrations in Polar Snows

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During the South Pole Traverse in 1968-69, one of the authors (FUJIWARA) collected ice cores to the depth of 1 m at intervals of 50 km between the South Pole and Syowa Station. The coring was undertaken by the use of a SIPRE

Table 1. Chemical constituents of polar snows.

Station No.	Location		Na in ppb	K in ppb	Mg in ppb
	Latitude	Longitude			
St. 70	69°07′S	42°28′E	93	5.3	12.4
St. 122	70 01	43 06	31	2.5	2.3
			31	4.5	2.7
			24	4.8	2.7
St. 170	70 50	43 05	43	5.5	3.9
St. 240	72 01	43 06	19	4.6	7.9
			77	17.3	3.7
St. 300	73 02	42 58	94	26	11
St. 414	75 00	42 50	63	5.0	6.5
			38	2.5	3.4
			37	7.0	12.8
St. 528	76 58	41 50	16	2.9	3.8
St. 580	77 51	41 10	35	13.6	6.6
			28	1.2	2.2
			18	1.5	1.6
			12	2.1	2.8
			13	2.3	1.8
St. 610	78 21	40 58	32	8.4	4.4
St. 638	78 84	40 45	42	8.6	4.6
St. 690	80 08	40 30	26	4.7	3.2
St. 725	81 18	40 27	26	4.5	2.0
St. 749	82 05	40 26	41	5.5	3.5
St. 771	82 49	40 17	32	7.5	4.2
St. 804	83 57	40 29	20	5.5	3.3
St. 837	85 04	40 50	35	5.4	3.0
St. 870	86 12	40 29	68	16.8	11
St. 897	87 10	39 30	25	3.6	1.7
St. 927	88 09	41 00	22	3.6	1.8
St. 947	88 50	41 00	23	0.9	4.0

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ice-auger at spots 150–200 m windward of the traverse route in order to avoid contamination.

The samples have been analyzed by the atomic absorption method and isotope dilution mass spectrometry. The former method using the Nippon Jarrell-Ash Model AA-1 Meter was applied to brines obtained by successive freezing of snow melts. The Hitachi RMU-6 mass spectrometer having a specially devised ion source made it possible to determine 10^{-8} g of potassium with sensitivity of 10^{-14} g and relative error of 1 percent. Results are listed in Table 1. Concentrations of sodium, potassium and magnesium have been found to be at the ppb level in weight.

Reference

MUROZUMI, M, J.T. CHOW and C.C. PATTERSON (1969): Sodium, potassium and magnesium concentration in polar snow. Geochim. Cosmochim. Acta., **33**, 1247-1294.